WHAT IS CLAIMED IS:

1. A system for processing signals, the system comprising:

a first phase shifter configured to receive or generate a first signal;

a second phase shifter configured to receive or generate a second signal;

a first variable time delay system coupled to the first phase shifter and configured to generate or receive a third signal;

a second variable time delay system coupled to the second phase shifter and configured to generate or receive a fourth signal;

a first signal processing system coupled to the first variable time delay system and the second variable time delay system and configured to generate or receive a fifth signal;

a sampling system configured to sample at least the third signal and the fourth signal and generate at least a sixth signal and a seventh signal respectively;

a switching system configured to receive the at least a sixth signal and a seventh signal and output an eighth signal and a ninth signal, the eighth signal being the same as one of the at least a sixth signal and a seventh signal, the ninth signal being the same as one of the at least a sixth signal and a seventh signal;

a measuring system configured to receive the eighth signal and the ninth signal and process at least information associated with the eighth signal and the ninth signal.

2. The system of claim 1 wherein the first variable time delay system comprises:

a second signal processing system coupled to the first phase shifter and configured to generate or receive at least a first divided signal and a second divided signal;

a third time delay system configured to receive or generate the first divided signal, generate or receive a third divided signal, and provide a first time delay to the first divided signal or the third divided signal;

a fourth time delay system configured to received or generate the second divided signal, generate or received a fourth signal, and provide a second time delay to the second divided signal or the fourth divided signal;

a first attenuator configured to receive or generate the third divided signal and generate or receive a fifth divided signal;

a second attenuator configured to receive or generate the fourth divided signal and generate or receive a sixth divided signal;

a third signal processing system configured to receive or generate the fifth divided signal and the sixth divided signal and generate or receive the third signal.

3. The system of claim 1 wherein the switching system comprises:

a first switch configured to receive the at least a sixth signal and a seventh signal and select one of the at least a sixth signal and a seventh signal as a first selected signal;

a second switch configured to receive the at least a sixth signal and a seventh signal and select one of the at least a sixth signal and a seventh signal as a second selected signal;

a third switch configured to receive the first selected signal and the fifth signal and select one of the first selected signal and the fifth signal as the eighth signal;

a fourth switch configured to receive the second selected signal and a test signal and select one of the second selected signal and the test signal as the ninth signal.

4. The system of claim 1 wherein the eighth signal is the same as the ninth signal.

5. The system of claim 1 wherein the eighth signal is different from the ninth signal.

6. The system of claim 1 wherein the at least the third signal and the fourth signal comprises the fifth signal, and the at least a sixth signal and a seventh signal comprises a tenth signal.

7. The system of claim 6 wherein the sixth signal is sampled from the third signal, the seventh signal is sampled from the fourth signal, and the tenth signal is sampled from the fifth signal.

8. The system of claim 1 wherein the measuring system is configured to determine a phase difference between the eighth signal and the ninth signal.

9. The system of claim 8 wherein the measuring system is further configured to determined a ratio between a magnitude of the eighth signal and the ninth signal.

10. The system of claim 1 wherein the first signal processing system is a signal combiner, a signal divider, or a signal combiner and divider.

11. The system of claim 10 wherein the first signal processing system is a signal combiner.

12. The system of claim 1, and further comprising:

a first amplifier coupled between the first phase shifter and the first variable time delay system;

a second amplifier coupled between the second phase shifter and the second variable time delay system.

13. A system for providing a time delay to a signal, the system comprising:

a first signal processing system configured to receive or generate a first combined signal and to generate or receive at least a first divided signal and a second divided signal;

a first time delay system configured to receive or generate the first divided signal, generate or receive a third divided signal, and provide a first time delay to the first divided signal or the third divided signal;

a second time delay system configured to received or generate the second divided signal, generate or received a fourth signal, and provide a second time delay to the second divided signal or the fourth divided signal;

a first phase shifter configured to receive or generate the third divided signal, generate or receive a fifth divided signal, and provide a first phase shift to the third divided signal or the fifth divided signal;

a second phase shifter configured to receive or generate the fourth divided signal, generate or receive a sixth divided signal, and provide a second phase shift to the fourth divided signal or the sixth divided signal;

a first attenuator configured to receive or generate the fifth divided signal and generate or receive a seventh divided signal;

a second attenuator configured to receive or generate the sixth divided signal and generate or receive an eighth divided signal;

a second signal processing system configured to receive or generate the seventh divided signal and the eighth divided signal and generate or receive a second combined signal.

14. The system of claim 13 wherein the second combined signal is associated with a relative time delay with respect to the first combined signal, the relative time delay associated with a reference time delay.

15. The system of claim 14 wherein the relative time delay depends on at least information associated with a first attenuation level of the first attenuator and a second attenuation level of the second attenuator.

16. The system of claim 15 wherein a phase difference at a predetermined frequency between the second combined signal and the first combined signal remains substantially the same regardless of the first attenuation level and the second attenuation level.

17. The system of claim 16 wherein the predetermined frequency is determined by at least information associated with the first phase shift and the second phase shift.

18. The system of claim 13 wherein the first time delay system comprises a cable, an optical fiber, or a transmission line.

19. The system of claim 13 wherein the first signal process system is a signal combiner, a signal divider, or a signal combiner and divider.

20. The system of claim 13 wherein the second signal processing system is a signal combiner, a signal divider, or a signal combiner and divider.

21. A method for processing signals, the method comprising:

selecting a reference signal;

selecting a first signal;

processing information associated with the reference signal and the first signal;

determining a first phase shift based on at least information associated with the reference signal and the first signal;

applying the first phase shift to the first signal;

determining a first time delay based on at least information associated with the reference signal and the first signal;

applying the first time delay to the first signal;

wherein the applying the first phase shift to the first signal is associated with the first phase-shifted signal, the first phase-shifted signal substantially free from any phase difference with respect to the reference signal at a predetermined frequency;

wherein the applying the first time delay to the first signal is associated with the first phase-shifted and time-delayed signal, the first phase-shifted and time-delayed signal substantially free from any phase difference with respect to the reference signal within a frequency range, the frequency range including the predetermined frequency.

22. The method of claim 21, and further comprising determining whether additional signal processing should be performed.

23. The method of claim 22, and further comprising:

if additional signal processing should be performed,

selecting a second signal;

processing information associated with the reference signal and the second signal;

determining a second phase shift based on at least information associated with the reference signal and the second signal;

applying the second phase shift to the second signal;

determining a second time delay based on at least information associated with the reference signal and the second signal;

applying the second time delay to the second signal.

24. A method for processing signals, the method comprising:

selecting a first signal from a plurality of signals, a sum of the plurality of signals being a combined signal, the combined signal associated with a first phase difference with respect to the first signal at a predetermined frequency;

processing information associated with the combined signal and the first signal;

determining a first phase shift and a first time delay based on at least information associated with the combined signal and the first signal;

applying the first phase shift and the first time delay to the first signal to generate the first phase-shifted and time-delayed signal;

wherein the first phase-shifted and time-delayed signal is associated with a second phase difference at the predetermined frequency with respect to a first combined phase-shifted and time-delayed signal, the first combined phase-shifted and time-delayed signal equal to a sum of the first phase-shifted and time-delayed signal and the plurality of signals other than the first signal;

wherein the second phase difference is smaller than the first phase difference at the predetermined frequency.

25. The method of claim 24, and further comprising:

selecting a reference signal from the plurality of signals, the reference signal being different from the first signal;

determining whether additional signal processing should be performed.

26. The method of claim 25, and further comprising:

if additional signal processing should be performed,

selecting a second signal from the plurality of signals, the second signal being different from the reference signal and the first signal, the first combined phase-shifted and time-delayed signal associated with a third phase difference with respect to the second signal at the predetermined frequency;

processing information associated with the first combined phase-shifted and time-delayed signal and the second signal;

determining a second phase shift and a second time delay based on at least information associated with the first combined phase-shifted and time-delayed signal and the second signal;

applying the second phase shift and the second time delay to the second signal to generate the second phase-shifted and time-delayed signal;

wherein the second phase-shifted and time-delayed signal is associated with a fourth phase difference at the predetermined frequency with

respect to a second combined phase-shifted and time-delayed signal, the second combined phase-shifted and time-delayed signal equal to a sum of the first phase-shifted and time-delayed signal, the second phase-shifted and time-delayed signal, and the plurality of signals other than the first signal and the second signal;

wherein the fourth phase difference is smaller than the third phase difference at the predetermined frequency.

27. A method for processing signals, the method comprising:

receiving a first combined signal;

generating a first divided signal and a second divided signal based on at least information associated with the first combined signal;

applying a first time delay to the first divided signal;

applying a second time delay to the second divided signal;

applying a first phase shift to the first divided time-delayed signal;

applying a second phase shift to the second divided time-delayed signal;

applying a first attenuation to the first divided time-delayed and phase-shifted signal;

applying a second attenuation to the second divided time-delayed and phase-shifted signal;

generating a second combined signal based on at least information associated with the first attenuated divided time-delayed and phase-shifted signal and the second attenuated divided time-delayed and phase-shifted signal.

28. The method of claim 27 wherein the second combined signal is associated with a relative time delay with respect to the first combined signal, the relative time delay associated with a reference time delay.

29. The method of claim 28 wherein the effective time delay depends on at least information associated with the first attenuation and the second attenuation.

30. The method of claim 29 wherein a phase difference at a predetermined frequency between the second combined signal and the first combined signal remains substantially the same regardless of the first attenuation and the second attenuation.

31. The system of claim 30 wherein the predetermined frequency is determined by at least information associated with the first phase shift and the second phase shift.

32. A method for using a system, the method comprising:

providing a system wherein the system comprising:

a first signal processing system;

a first time delay system coupled to the first signal processing system and configured to provide a first time delay;

a second time delay system coupled to the first signal processing system and configured to provide a second time delay;

a third time delay system coupled to the first signal processing system and configured to provide a third time delay;

a first phase shifter coupled to the first time delay system and configured to provide a first phase shift within a first phase shift range;

a second phase shifter coupled to the second time delay system and configured to provide a second phase shift within a second phase shift range;

a third phase shifter coupled to the third time delay system and configured to provide a third phase shift within a third phase shift range;

a first attenuator coupled to the first phase shifter and configured to provide a first attenuation within a first attenuation range;

a second attenuator coupled to the second phase shifter and configured to provide a second attenuation within a second attenuation range;

a third attenuator coupled to the third phase shifter and configured to provide a third attenuation within a third attenuation range;

a second signal processing system coupled to the first attenuator, the second attenuator and the third attenuator;

wherein the first time delay is shorter than or equal to the second time delay and the second time delay is shorter than or equal to the third time delay;

inputting a first signal to the first signal processing system;

measuring a second signal from the second signal processing system;

processing information associated with the first signal and the second signal;

determining a reference time delay between the second signal and the first signal based on at least information associated with the first signal and the second signal;

establishing a first phase synchronization between a first output of the first attenuator and a second output of the second attenuator at a predetermined frequency;

establishing a second phase synchronization between a third output of the third attenuator and the second output of the second attenuator at the predetermined frequency;

adjusting at least one of the first attenuation, the second attenuation, and the third attenuation;

measuring a third signal from the second signal processing system;

processing information associated with the first signal and the third signal;

determining an relative time delay between the third signal and the first signal with respect to the reference time delay based on at least information associated with the first signal and the third signal.

33. The method of claim 32 wherein the measuring a second signal from the second signal processing system comprises:

adjusting the second phase shift to be substantially at a midpoint of the second phase shift range;

adjusting the second attenuation to be substantially at a minimum of the second attenuation range;

adjusting the first attenuation to be substantially at a maximum of the first attenuation range;

adjusting the third attenuation to be substantially at a maximum of the third attenuation range.

34. A method for using a system, the method comprising:

providing a system wherein the system comprises:

a first phase shifter configured to provide a first phase shift;

a second phase shifter configured to provide a second phase shift;

a first variable time delay system coupled to the first phase shifter and configured to provide a first time delay;

a second variable time delay system coupled to the second phase shifter and configured to provide a second time delay;

a signal processing system coupled to the first variable time delay system and the second variable time delay system;

a sampling system configured to sample at least a first output of the first variable time delay system and a second output of the second variable time delay system;

a switching system configured to receive the at least a first output and a second output and output a third signal and a fourth signal, the third signal same as one of the at least a first output and a second output, the fourth signal same as one of the at least a first output and a second output;

a measuring system configured to process at least information associated with the third signal and the fourth signal;

inputting a fifth signal to the first phase shifter;

inputting a sixth signal to the second phase shifter, the sixth signal and the fifth signal associated with substantially the same phase and the same time delay;

adjusting the first output and the second output, the adjusted first output and the adjusted second output associated with substantially the same phase and the same time delay;

processing information associated with the third signal and the fourth signal, the third signal related to the fifth signal, the fourth signal related to the sixth signal;

determining a phase difference based on at least information associated with the third signal and the fourth signal.

35. A system for processing signals, the system comprising:

a first signal processing system;

a first time delay system coupled to the first signal processing system and configured to provide a first time delay;

a second time delay system coupled to the first signal processing system and configured to provide a second time delay;

a first phase shifter coupled to the first time delay system and configured to provide a first phase shift;

a second phase shifter coupled to the second time delay system and configured to provide a second phase shift;

a first attenuator configured to the first phase shifter and configured to provide a first attenuation;

a second attenuator configured to the second phase shifter and configured to provide a second attenuation;

a second signal processing system coupled to the first attenuator and the second attenuator.

36. A system for processing signals, the system comprising:

a first phase shifter configured to provide a first phase shift;

a second phase shifter configured to provide a second phase shift;

a first variable time delay system coupled to the first phase shifter and configured to provide a first time delay;

a second variable time delay system coupled to the second phase shifter and configured to provide a second time delay;

a signal processing system coupled to the first variable time delay system and the second variable time delay system;

a sampling system configured to sample at least a first output of the first variable time delay system and a second output of the second variable time delay system;

a switching system configured to receive the at least a first output and a second output and output a third signal and a fourth signal, the third signal same as one of the at least a first output and a second output, the fourth signal same as one of the at least a first output and a second output;

a measuring system configured to process at least information associated with the third signal and the fourth signal.